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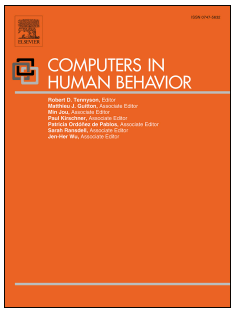

Teachers' acceptance and use of digital learning environments after hours: Implications for work-life balance and the role of integration preference

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Teachers' acceptance and use of digital learning environments after hours: Implications for work-life balance and the role of integration preference.

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Teachers' acceptance and use of digital learning environments after hours: Implications for work-life balance and the role of integration preference.

Abstract

While a growing number of teachers use information and communication technology (ICT) for work tasks outside the formal working hours and premises, research is inconclusive how this relates to their work-life balance. Following calls to examine the antecedents and moderating mechanisms of such behavior, the present study aims to examine how technology acceptance relates to work-related ICT use after hours (WIA) and work-life balance, as well as how employees' integration preference affects these relationships. Data was collected among 288 secondary school teachers in Flanders (Belgium) concerning their use of digital learning environments (DLE) beyond school grounds and school hours. Structural equation modelling shows that social influence reduces teachers' work-life balance mediated by WIA. While there was no support for other technology acceptance factors or the moderating role of integration preference, performance expectancy of the DLE and integration preference were associated with a higher work-life balance. Hereby, this study contributes to research on WIA by integrating the technology acceptance framework with boundary theory and work-life research. Overall, the findings show that DLE have an impact on teachers' work-life balance independent of technological factors or their personal preference, underscoring the importance of school policies that cement the use of DLE in the private domain.

1. INTRODUCTION

A growing number of employees use information and communication technology (ICT) for work tasks outside of their normal working hours and physical workspace. This expansion of work duties to non-work time challenges employees' work-life balance (Adisa, Gbadamosi & Osabutey, 2017) or their disposition over "sufficient time to meet commitments at both home and work" (Guest, 2002, p. 263). This is particularly the case among teachers. As knowledge workers, teachers are increasingly confronted with the integration of ICT into their pedagogical practices in response to innovation and professionalization demands (Kreijns, Vermeulen, Kirschner, Buuren, 2013; Ottestad, & Gudmundsdottir, 2018). A notable case is the use of digital learning environments (DLE), digital tools that enable teachers to create online course pages and share learning materials with students, accessible via a web browser or app. DLE offer teachers advantages like enhanced flexibility and instructional opportunities (De Smet, Bourgonjon, De Wever, Schellens, & Valcke, 2012; Pynoo et al., 2011). However, there are also increasing concerns over their use extending to the private sphere. For example, the instructional use of DLE typically require more preparation time than stipulated in teachers' contractual hours (Li & Wang, 2020), while such tools also allow students to contact their teachers beyond school hours. Such examples illustrate that DLE are often used by teachers for work tasks beyond school grounds and school hours. This could prevent teachers from achieving a healthy work-life balance (Ibieta, Hinostroza, Labbé, & Claro, 2017).

Despite such work-life balance concerns, the theoretical relationship between work-related ICT use after hours (WIA) and balancing one's work and life responsibilities remains the subject of debate (Allen, Johnson, Kiburz, & Shockley, 2013; Demerouti, Derks, ten Brummelhuis, & Bakker, 2014; Ďuranová & Ohly, 2016; Xie, Ma, Zhou, & Tang, 2018). While

past research suggests WIA creates imbalance between work and life domains (Adkins & Premeaux, 2014; Chen & Karahanna, 2014; Fenner & Renn, 2010; Gadeyne, Verbruggen, Delanoeije, & De Cooman, 2018), other studies suggest that WIA can help restore the balance between such domains (Derks, Bakker, Peters, & van Wingerden, 2016; Golden, 2013; König & De La Guardia, 2014). For example by enabling employees to be more productive and flexible (Ragsdale & Hoover, 2016). To resolve this inconclusive debate, scholars have called for a better inquiry into the *antecedents* and *individual differences* underlying WIA and its outcomes (Schlachter, McDowall, Cropley, & Inceoglu, 2018). The current study answers these calls in two ways.

On the one hand, we address the antecedents of WIA to explain why employees engage in WIA. Past research has strongly drawn on technology acceptance model (TAM; Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh, Morris, Davis, & Davis, 2003) to describe the psychological factors that influence different kinds of ICT use by employees (Korunka & Vartiainen, 2017). Recent studies suggest the factors in these models not only predict general ICT use, but also specific forms like WIA (Fenner & Renn, 2010; Tennakoon, Da Silveira, & Taras, 2013). Therefore, we build on the TAM and UTAUT to hypothesize that perceiving DLE as (1) easy to use, (2) having professional benefits, combined with (3) experiencing social pressure and (4) technical support and training relate to increased WIA, ultimately affecting employee's work-life balance.

On the other hand, we focus on individual difference factors that may explain past conflicting findings. Prior research asserts that the determinants and consequences of WIA can be better understood by looking at how these relations are regulated by individual differences (Ďuranová & Ohly, 2016; Valcour & Hunter, 2005). In particular, scholars increasingly point to

individual preferences for integrating work and life domains, which are central to how employees perceive their work-life balance (Kreiner, 2006). Employees typically vary on a continuum from 'segmentors' that prefer to keep life domains separate to 'integrators' that like to intermix activities from different life domains (Gadeyne et al., 2018; Park, Kim, & Lee, 2020; Xie et al., 2018). The importance of employees' integration preference is signaled by boundary theory (Ashforth, Kreiner, & Fugate, 2000), which states that how individual perceive and manage the boundaries between different life domains has important consequences to how they will experience and react when these boundaries are transgressed or challenged (Day, Barber, & Tonet, 2019). Therefore, we examine how integration preference regulates the relationship between technology acceptance, WIA and work-life balance.

In examining these antecedents and individual factors, the present study contributes to the literature on WIA by integrating technology acceptance (Davis, 1989; Venkatesh et al., 2003) with boundary theory (Ashford et al., 2000) and focusing on work-life balance as an outcome. While past research has mostly examined conflict between work and life domains, work-life balance has a more comprehensive view of the life domain, which stretches beyond employees' family life (Adisa et al., 2017; Boswell & Buchanan, 2007). To make these contributions, we focus on secondary school teachers' use of DLE beyond school grounds and school hours, a specific form of WIA in the education sector (Park, Liu, & Headrick, 2018). The antecedents of DLE use and implementation among teachers are well documented (e.g., Hrtoňová, Kohout, Rohlíková, & Zounek, 2014; Islam, 2014; Scherer & Teo, 2019; Pynoo et al., 2011). However, the personal implications of DLE have mostly been highlighted for students (Edmunds, Thorpe, & Conole, 2012) and teachers have received significantly less attention in this regard (Lochner, Conrad, & Graham, 2015). In what follows, we formulate hypotheses on relationship between

technology acceptance and WIA and work-life balance, as well as how integration preference moderates these relationships. Subsequently, we present the methods and results, before concluding with theoretical implications and suggestions for further research on WIA.

2. THEORY

2.1 Technology acceptance and WIA

While significant scholarly attention has been devoted to understanding employees' ICT use, recently the attention has broadened towards the use of ICT in specific contexts (Tennakoon et al., 2013). The present study is concerned with WIA, referring to "ICT use *outside regular work hours* and *away from regular work premises* with the purpose of performing work-related tasks and communications" (Schlachter et al., 2018, p. 826). WIA as a phenomenon is particularly prevalent among knowledge workers, like teachers and presents a type of 'hybrid' ICT use behavior that transcends the work and life domains (Fenner & Renn, 2010; Schlachter et al., 2018). Traditionally, the determinants of specific ICT use behavior are explained by the TAM and the UTAUT. Building upon the theory of reasoned action (Ajzen & Fishbein, 1980), both frameworks describe the psychological mechanisms and factors that influence employees' ICT use (Korunka & Vartiainen, 2017). The TAM (Davis, 1989) distinguishes two main determinants of ICT use, advancing that employees will use ICT more frequently when they perceive it as functional and advantageous to their job performance (i.e. performance expectancy), as well as easy and practical in its use (i.e. effort expectancy). The UTAUT framework (Venkatesh et al., 2003) complements the TAM model with the inclusion of two additional factors: social influence and facilitation conditions. In other words, employees are also more likely to use a particular technology when they experience pressure or support from significant others, like their school

board, supervisor, colleagues, parents or other peers to use the technology (i.e. social influence). Also, when employees believe they have access to the necessary training, technical support and infrastructure (i.e. facilitation conditions) (Venkatesh et al., 2003). Combined, these models suggest that positive appraisal of ICT among employees "emphasiz[es] its resourcing functions" and increases the likelihood of employees engaging in work-related ICT (Ďuranová & S Ohly, 2016, p. 69).

Both TAM and UTAUT enjoy broad empirical support. In particular, past research demonstrates that performance expectancy presents a potent predictor of technology use in both work (Korunka & Vartiainen, 2017; Pynoo et al., 2011) and life domains (Fenner & Renn, 2010; Tennakoon et al., 2013). While their relationships are considered more modest (Pynoo et al., 2011), this also applies for effort expectancy (Edmunds et al., 2012) and facilitating conditions (Bentley, Teo, McLeod, Bosua, & Gloet, 2016). Finally, concerning social influence, scholars like Adkins and Premeaux (2014) and Richardson and Benbunan-Fich (2011) observed that workplace norms and policies were associated with increased WIA. Therefore, we hypothesize:

H1(a): *Performance expectancy enhances teachers' WIA.*

H1(b): *Effort expectancy enhances teachers' WIA.*

H1(c): *Social influence enhances teachers' WIA.*

H1(d): *Facilitation conditions enhances teachers' WIA.*

2.2 WIA and work-life balance

Work-life balance refers to employees' perceptions of having sufficient time to meet their commitments at work and at home (Guest, 2002). While prior studies have mostly focused on related concepts as work-family conflict and work-family interference (cf. Gadeyne et al., 2018),

work-life balance takes a broader understanding of employees' private life, which is not ipso facto restricted to their family life (Adisa et al., 2017; Boswell & Buchanan, 2007). The relationship between WIA and work-life balance must be seen in light of boundary theory (Ashford et al., 2000). This theory advances that while the work and life domains seem independent; employees actively construct and transgress these boundaries on a daily basis. Depending on how employees manage the boundaries between the work and life domains, activities in one domain can create spillovers to the other domain, resulting in role conflict or role confusion.

While WIA challenges the boundaries between work and life, past research is ambivalent on how WIA relates to one's work-life balance. ICT allows temporal and spatial mobility of certain work duties, making the boundary between the work and life domains less stringent (Schlachter et al., 2018). However, this can work in two directions, as described by the *empowerment-enslavement paradox* (Jarvenpaa & Lang, 2005). On the one hand, using ICT for work after hours could induce 'supplemental work' or 'work creep', extending tasks and obligations from the work to the life domains (Boswell & Buchanan, 2007; Fenner & Renn, 2010). Such supplement work risks creating spillovers of role stress and role overload from one domain to the other, causing imbalances between work and life. For example, the possibility of using ICT for work during weekends might translate itself into a perceived obligation to perform certain work tasks after work hours (i.e. enslavement), embargoing one's work-life balance (Adkins & Premeaux, 2014; Wang et al., 2019). On the other hand, employees might also use the flexibility of ICT to reduce weekly work demands and restore the equilibrium in one's work-life balance (i.e. empowerment). For example, WIA can be a strategy to reduce some of the demands faced during work time, especially when those demands could have had negative spillovers to

life domains. In this case, WIA is suggested to stimulate employees' work-life balance (Derks et al., 2016; Golden, 2013; König & De La Guardia, 2014).

Notwithstanding the ambivalent nature of the relationship between WIA and employee's work-life balance (Schlachter et al., 2018), the current empirical support points in the directions of a negative relationship between WIA and employees' work-life balance (e.g., Boswell & Buchanan, 2007; Chen & Karahanna, 2014; Fenner & Renn, 2010; Gadeyne et al., 2018). Therefore, we hypothesize:

H2: *WIA reduces teachers' work-life balance.*

In the previous paragraphs, we argued based on the UTAUT-framework that technology acceptance factors are associated with a stronger use of ICT, also after hours (Adkins & Premeaux, 2014; Bentley et al., 2016; Fenner & Renn, 2010; Tennakoon et al., 2013). In addition, we used boundary theory (Ashford et al., 2000) to advance that WIA negatively impacts employees' work-life balance (Gadeyne et al., 2018; Schlachter et al., 2018; Wright et al., 2014), because it complicates boundary management between work and life domains. On this basis, we propose that when employees are more accepting of a particular technology, they are more likely to use that particular technology, also across work and life domains. In turn, this cross-domain use impacts the segmentation of role expectations during work and life domains, challenging employees' work-life balance. Therefore, we also hypothesize:

H3(a): *WIA mediates the relationship between performance expectancy and teachers' work-life balance.*

H3(b): *WIA mediates the relationship between effort expectancy and teachers' work-life balance.*

H3(c): *WIA mediates the relationship between social influence and teachers' work-life balance.*

H3(d): *Work-related WIA mediates the relationship between facilitating conditions and teachers' work-life balance.*

2.3 The moderating role of integration preference

Scholars assert that the determinants and consequences of WIA can be better understood by looking at the role of individual differences. Such individual differences can help to understand how ICT is perceived by different employees and explain inconsistent findings from past research (Day et al.,2019; Gadeyne et al., 2018; Valcour & Hunter, 2005). Both the UTAUT framework (Venkatesh et al. 2003) and boundary theory (Ashford et al., 2000) underscore the importance of such individual differences. For example, the UTAUT advances that the relationships between technology acceptance factors (i.e. effort expectancy, performance expectancy, social norms and facilitation conditions) and WIA can be regulated by the gender, age, tenure and voluntariness of the employee (Korunka & Vartiainen, 2017). Similarly, boundary theory (Ashford et al., 2000) builds upon that voluntariness by positing that the boundary between work and life domains is not that stringent for every employee. Rather, it presents a continuum: on one side of the continuum, we find 'integrators', employees that have a strong preference for combining work and life activities (i.e. integration preference) and are more likely to engage in work-related activities after hours and vice versa. On the other side of the continuum, are 'segmentors', employees that prefer work and life to be compartmentalized domains. Compared to integrators, segmentors are more temperate and restrictive in their WIA (Ďuranová & Ohly, 2016). This distinction between integrators and segmentors could be

particularly important to explain individual differences in the use and consequences of ICT beyond the work domain (Day et al., 2019).

Combining the UTAUT-framework and boundary theory, we advance that for employees with a higher integration preference, technology acceptance is more likely to facilitate WIA. Employees are more likely to engage in cross-domain behavior, like WIA, when they perceive the particular technology as easy to use (i.e. effort expectancy), having professional benefits (i.e. performance expectancy) and feel technically and practically supported (i.e. facilitating conditions), especially when they possess a higher preference for integrating work and life domain activities. Furthermore, employees with a higher integration preference might be more compliant to social pressure about WIA, particularly when such norms are congruent with their preference and WIA (i.e. social influence) (Gadeyne et al., 2018; Yang et al., 2019). Therefore, we posit that employees' integration preference stimulates technology acceptance's contribution to WIA. Subsequently, employees' integration preference might also regulate the impact of WIA on their work-life balance (Ďuranová & S Ohly, 2016). Since ICT challenges the boundary between work and non-life domains, WIA might be experienced as more challenging by employees with a lower segmentation preference, with consequences for one's work-life balance (Derks et al., 2016). For example, in a study by Wang (2019) the negative implications of WIA on work-family conflict were buffered by integration preference, while in a study by Derks et al. (2016) they were enhanced by segmentation preference. Furthermore, Gadeyne et al. (2018) found a similar influence of integration preference on the relationship with work-to-home-conflict and home-to-work-conflict as outcome.

With the above arguments in mind, we argue that the relationship between technology acceptance and work-life balance, mediated by WIA (cf. section 2.2) is stronger when employees have a higher integration preference:

H4(a): *Integration preference positively moderates the mediation of WIA between performance expectancy and teachers' work-life balance.*

H4(b): *Integration preference positively moderates the mediation of WIA between effort expectancy and teachers' work-life balance.*

H4(c): *Integration preference positively moderates the mediation of WIA between social influence and teachers' work-life balance.*

H4(d): *Integration preference positively moderates the mediation of WIA between facilitation conditions and teachers' work-life balance.*

H4(d): *Integration preference positively moderates the mediation of WIA between facilitation conditions and teachers' work-life balance.*

3. MATERIALS & METHODS

3.1 Participants & Procedure

This study adopted a quantitative, cross-sectional design. A sample of teachers was recruited in secondary schools in Flanders (Belgium) through an online Questionnaire (Qualtrics) during December 2017 and January 2018. We contacted the headmasters of secondary schools in Flanders through contact information that was available with the Flemish Ministry of Education and requested these headmasters to spread the questionnaire among their teachers. We also used our own networks to convince teachers to participate. A total of 288 teachers filled in the survey. The majority of teachers was female (64.3%), 42.22 years old and enjoyed 16.44 years of

experience. Furthermore, the average teacher was employed within a vocational (40.6%) and private school (62.5%). Concerning DLE, most teachers used Smartschool (86.50%), followed by Schoolonline (10.8%). Only a minority of teachers used another DLE (2.7%).

3.2 Measures

Unless indicated differently, items were measured on seven-point Likert-scales (1 = totally disagree; 7 = totally agree). All measures were pre-validated in past research and translated items were piloted before they were administered to the final sample.

Technology acceptance was measured using the scale by Venkatesh et al. (2003). Dutch validated items were retrieved from De Witte & Van Daele (2017) and adapted to the context of DLE. An example item is "Using the DLE enables me to accomplish tasks more quickly." This scale distinguishes between performance expectancy (α =.94, CR=.95), effort expectancy (α =.91, CR=.91), social influence (α =.85, CR=.86) and facilitating conditions (α =.79, CR=.79). For facilitating conditions, two items had λ< .50 and were removed ("I possess the necessary resources to use the DLE", "I have had the opportunity for further training on the use of the DLE"). All subscales had satisfactory internal and composite reliabilities, with standardized factor loading in range .54-.91.

WIA was measured based on Boswell & Olson-Buchanan (2007) and Richardson & Benbunan-Fich (2011) by asking participants to state the frequency (on a Likert- scale) with which they engaged in a couple of DLE-related tasks outside of their formal job hours and physical workplace. An example item is "How much time do you spend on communication with parents and/or students via the DLE on a free day during the school year". This scale had

acceptable internal (α =.81) and composite reliability (CR = .79), with standardized factor loading in range .82-.91.

Integration preference was assessed with the scale by Richardson & Benbunan-Fich (2011), with a higher score referring to a stronger tolerance for integrating work and private activities. An example item is "I am willing to take care of work-related business while I am at home". The scale had good internal (α =.84) and composite reliability (CR = .83), with standardized factor loading in range .63-.79.

Work-life balance was measured with the scale by Valcour (2007), which measures the extent to which employees are satisfied with the balance between their work and different life domains. An example item is "Are you satisfied with your ability to balance the needs of your job with those of your personal or family life". The scale had good internal (α =.97) and composite reliability (CR=.97), with standardized factor loading in range .88-.98.

Control variables were included for gender, tenure, work hours, school type (general education, technical education, vocational education, special needs education), DLE (Smartschool, Schoolonline or other) and whether the teacher taught in a public or free school. Past research demonstrates these variables affect people's technology acceptance (Fenner & Renn, 2010), their integration preference (Adkins & Premeaux, 2014) and work-life balance (Valcour, 2007).

3.3 Analytical approach

Analyses followed the recommended two-step procedure (Kline, 2015). First, the psychometric qualities of the hypothesized measurement model were subjected to confirmatory factor analysis (CFA) with Maximum Likelihood and robust standard errors. Second, structural equation

modelling was performed to test the structural relations between the latent variables in the model. Models were considered a good fit to the data when the root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) were between.050 and .100, while the Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) approximated .90 (Kline, 2015). In addition, the Satorra-Bentler chi-square (χ^2) was reported, which is more conservative and corrects for non-normality (Satorra & Bentler, 2001). Following Preacher and Hayes (2008), mediation and moderated mediation were assessed with bootstrapped confidence intervals for the (conditional) indirect effects. Analyses were performed in R with the packages *Lavaan* (Rosseel, 2012) and *semTools* (Jorgensen, 2019).

3.4 Common Source Bias

This study relies on perceptual data from self-reported surveys, which theoretically relevant due to its focus on teachers' perceptions and personal judgements. While self-reports are characteristic of technology acceptance studies (Scherer & Teo, 2019), we followed earlier recommendations (George & Pandey, 2017; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) to apply procedural remedies before and after the data collection. During the data collection, we took a couple of measures to mitigate potential common source bias concerns. Among others, the survey instrument was restricted to measures with established psychometric qualities that were noncomplex and had clearly labelled response options. Predictors and dependents were separated in the questionnaire to induce a psychological lag time, while the cover letter stressed participants' anonymous and voluntary participation to minimize social desirability. After the data collection, we conducted a series of statistical remedies to diagnose potential common source bias by performing a single factor and common factor test through CFA.

4. RESULTS

4.1 Preliminary analyses

To test the factor structure of the latent variables in the model, CFA with Maximum Likelihood and robust standard errors was performed. The models and fit indices are in Table 1. The hypothesized seven-factor measurement model (five UTAUT-factors plus integration preference and work-life balance) was tested against a four-factor model (all UTAUT-factors as one dimension), a one-factor model and a common latent factor model. The hypothesized model demonstrates good fit to the data (χ^2 = 956.30; df = 537;CFI =.92; TLI = .91; RMSEA = .07; SRMR = .06). All items loaded significantly on their factors (λ >.50) and average variance extracted (AVE) for each factor surpassed .50, save for facilitation conditions (AVE = .44). However, we retained this factor since its internal reliability (α = .80) and composite reliability (CR= .79) are satisfactory. While the four-factor model fitted the data significantly worse ($\Delta\chi^2$ = 884.67, Δdf = 15, p < .00), the one-factor ($\Delta\chi^2$ = 1273.66, Δdf = 90, p < .00) and common factor model also significantly reduced fit ($\Delta\chi^2$ = 45.95, Δdf = 26, p < .00). Together these results support the convergent and divergent validity of the hypothesized measurement model and suggest considerable common source bias is absent.

Based on the measurement model, two competing structural models were tested. A *partial moderated mediation* foresaw a mediation of WIA between the UTAUT-factors and work-life balance, moderated by teachers' integration preference. This model was contrasted against a *full moderated mediation model*, in which UTAUT-factors had no direct relations with work-life balance. Results show that the partial model shows acceptable fit to the data (χ^2 = 1482.31; df = 1037;CFI =.88; TLI = .87; RMSEA = .06; SRMR = .06), while the full moderated mediation

model was a significant worse fit to the data ($\Delta\chi^2 = 55.41$, $\Delta df = 117$, $p < .01$). Therefore, the partial moderated mediation model was used for hypothesis testing.

	χ^2	AIC	df	CFI	TLI	RMSEA	SRMR
Measurement models							
Seven-factor model (hypothesized)	931.59	21370.99	504	.91	.90	.06	.07
Four-factor model (UTAUT as one)	1816.26	22419.09	519	.73	.71	.11	.10
One-factor model (CSB)	2205.25	14007.17	594	.34	.29	.17	.17
Common factor model (CSB)	977.54	12461.77	530	.81	.77	.08	.07
Structural models							
Partial moderated mediation model	1482.31	17603.82	1037	.88	.87	.06	.06
Full moderated mediation model	1504.32	17601.00	920	.88	.87	.06	.08

Note. CFI = comparative fit index, TLI = Tucker-Lewis index, RMSEA = root mean square error of approximation, SRMR = standardized root mean square residual, CSB = common source bias.

Table 1. Models and fit indices

4.2 Hypothesis testing

The descriptive statistics and correlations are in Table 2 and give an initial indication of the hypothesized relationships between the variables in the study. Since correlations between the key variables in the model did not exceed |.800| and variance inflation factors (VIF) remained in range 1.14-5.93, multicollinearity was concluded absent (Kline 2015).

		M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Gender (1 = female)	.64	.48																	
2	Tenure	16.44	1.39	.07																
3	Work hours	37.85	12.99	-.13*	-,15*															
4	General education	.20	.40	.09	.07	.08														
5	Technical education	.37	.48	-.10	.09	.01	-.39**													
6	Vocational education	.41	.49	.02	.12	.07	-.42**	-.64**												
7	Special needs education	.02	.13	.03	.09	.03	.07	.10	.11											
8	School affiliation (1 = private/free)	.74	.44	.12	.25**	.01	.12	.07	-.19**	.08										
9	Smartschool	.86	.34	-.04	.03	.02	.10	-.14*	.06	.05	-.20**									
10	Schoolonline	.11	.31	-.01	.06	.02	.08	.15*	.07	.04	.18**	-.88**								
11	Other	.03	.16	.11	.06	.09	.07	.01	.01	.21**	.09	-.43**	.06							
12	Effort expectancy	4.78	1.32	.04	.12	.05	.11	.06	.03	.01	.04	.18**	-.27**	.11						
13	Social influence	5.28	.99	.08	.04	.07	.10	-.17**	.08	.03	.02	.31**	-37	.08	.13*					
14	Performance expectancy	5.38	1.02	-.01	.12	.05	.11	.08	.01	.02	.017	.15*	-.19**	.06	.60**	.17**				
15	Facilitating conditions	4.70	1.29	.08	.06	.01	.16*	-.15*	.03	.04	.06	.04	.08	.08	.65**	.18**	.46**			
16	Integration preference	4.86	1.18	-.05	.02	.09	.05	.04	.09	.03	.02	.05	.09	.06	.12	.01	.11	.17**		
17	Work-related ICT use after hours (WIA)	2.71	.99	.11	.03	.25**	.02	.10	.11	.01	-.16*	.16*	-.19**	.04	.04	.26**	.04	.02	.06	
18	Work-life balance	4.43	1.49	-.07	.14*	-.33**	.03	.02	.02	.02	.07	.07	.08	.01	.11	.04	.20**	.23**	.20**	-.26**

Note. * p < .05 ** p < .01 *** p < .001

Table 2. Descriptive statistics and correlations (N=288)

Table 3 reports the regression results for the final structural model. A graphical depiction is in Figure 1. Findings show that, compared to other DLEs, teachers using Smartschool experience lower performance expectancy (B = -.36, p < .05), effort expectancy (B = -.40, p < .00) and work-life balance (B = -.34, p < .00). Similarly, teachers using Schoolonline perceived lower performance expectancy (B = -.49, p < .01), effort expectancy (B = -.62, p < .00) and work-life balance (B = -.29, p < .01), but also less social influence (B = -.33, p < .01). Teachers in technical education experience significantly lower technical support (B = -.28, p < .01) and more social pressure to use DLE (B = -.22, p < .05) compared to their colleagues in general education. In contrast, teachers in vocational education report more WIA (B = .30, p < .01). Teachers that report more work hours also signal more WIA (B = -.28, p < .01) and a lower work-life balance (B = -.28, p < .01).

In line with H1(c), teachers that experienced more social pressure also indicate to engage more frequently into WIA (B = .26, p < .01). However, WIA did not significantly relate to performance expectancy, effort expectancy or social influence. Hence, H1(a, b, d) were not supported. Confirming H2, intense WIA was associated with a lower work-life balance (B = -.19, p < .05). Since social pressure is related to WIA and the latter to work-life balance, we calculated the mediating effect of social influence on work-life balance. Based on a bootstrapping procedure of 10,000 samples, the indirect effect of social influence on work-life balance was -.12 (BootCI = -.20; -.04, p < .01). While modest, these results confirm H3(b) and support full mediation. Since the other UTAUT-dimensions had no significant relations with work-related ICT usage after hours, indirect effects were not computed and Hypotheses 3 (a, b, d) were rejected. However, contrary to expectations, performance expectancy emerged as a direct stimulator of teachers' work-life balance (B = .27, p < .00). H4(a, b, c, d, e) stipulate that

integration preference moderates the mediation of work-related ICT usage after hours between UTAUT-dimensions and work-life balance. Since both mediating and moderating effects were absent for performance expectancy, effort expectancy and facilitating conditions, H4(a, c, d) were subsequently rejected. While integration preference significantly reduced the relationship between effort expectancy and WIA (B = -.27, p < .05), as predicted by Hypothesis 4(b), both main effects were not significant, and this hypothesis was ultimately rejected. Notwithstanding the disconfirmation of these hypotheses, a direct relationship between integration preference and work-life balance was observed. Teachers that preferred a less strict boundary between work and life domains, also reported a higher work-life balance (B = .21, p < .00).

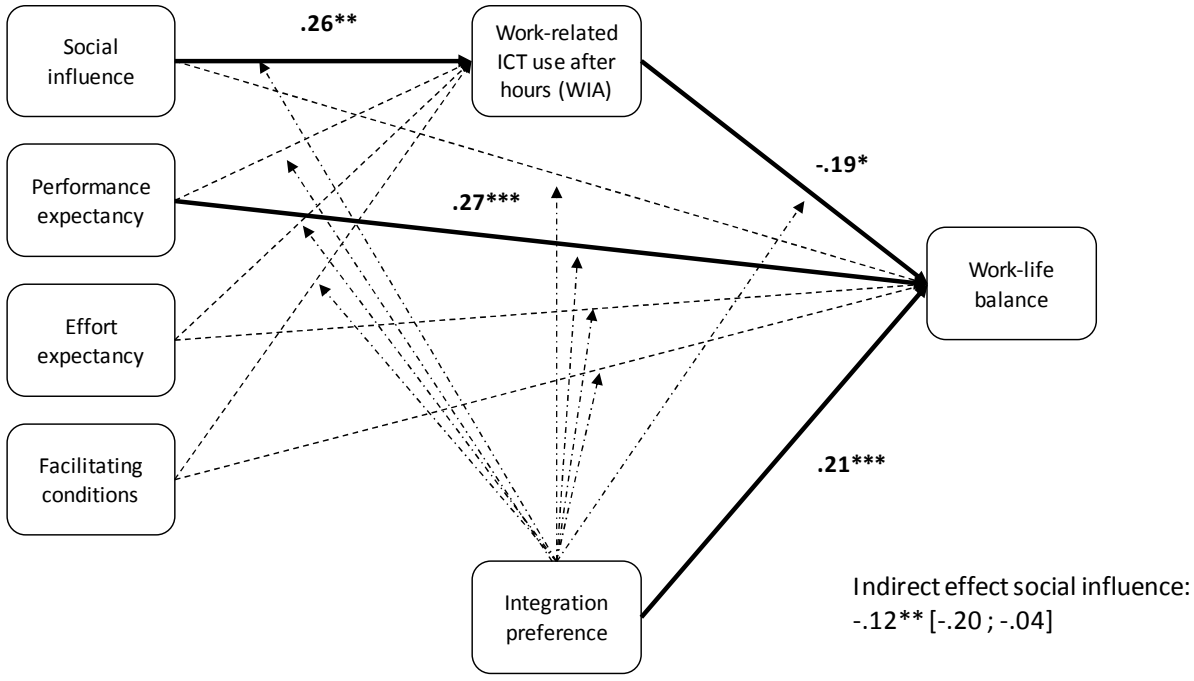

Figure 1. Graphical display of the structural model

	Performance expectancy		Effort expectancy		Facilitating conditions		Social influence		WIA		Work-life balance	
	B	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Gender (1 = female)	.01	.23	.04	.14	-.04	.19	.05	.18	.13	.12	-.14	.21
Tenure	-.08	.01	-.09	.01	-.14	.01	-.06	.01	.09	.01	.04	.01
Work hours	-.01	.01	-.05	.01	-.04	.01	.04	.01	.24**	.01	-.33***	.01
School type												
General education	-	-	-	-	-	-	-	-	-	-	-	-
Technical education	-.05	.28	-.18	.16	-.28**	.21	-.22*	.24	.12	.14	.06	.33
Vocational education	-.04	.28	-.13	.15	-.18	.20	-.08	.23	.30**	.15	.07	.33
Special needs education	-.09	.62	-.10	.57	-.11	.80	-.04	.48	.06	.25	-.03	.44
School affiliation (1 = private/free)	.06	.23	.09	.16	.08	.21	.11	.20	-.25***	.14	.08	.30
DLE												
Smartschool	-.36*	.61	-.40***	.30	-.25	.72	-.06	.42	.09	.57	-.34***	.33
Schoolonline	-.49**	.67	-.62***	.35	-.27	.75	-.33**	.51	-.04	.59	-.29**	.55
Other	-	-	-	-	-	-	-	-	-	-	-	-
Performance expectancy [PE]									-.02	.06	.27***	.10
Effort expectancy [EE]									.04	.15	-.03	.38
Facilitating conditions [FC]									-.02	.11	.05	.26
Social influence [SI]									.26**	.06	.09	.11
Integration preference [IP]									.02	.07	.21***	.13
IP x PE									-.06	.04	-.09	.07
IP x EE									-.27*	.07	.04	.15
IP x FC									.15	.06	-.05	.12
IP x SI									.04	.04	.05	.06
Work-related ICT use after hours [WIA]											-.19*	.17
IP x WU											.01	.08

Note. * p < .05 ** p < .01 *** p < .001

Table 3. Regression results

4.3 Additional analyses

A recent review by Schlachter et al. (2018) proposes that WIA might yield non-linear relationships with its outcomes. Such non-linear relationships could help to further comprehend inconsistent findings from past research. For example, modest displays of WIA could benefit employees' work-life balance, while for excessive use the opposite could be the case. Therefore, we ran an additional linearity check, where WIA and its squared effect were regressed on teachers' work-life balance, controlled for the other variables in the model. Results shows a significant quadratic effect of WIA on work-life balance, supporting modest nonlinearity (B = .05, $p < .05$). Looking at the plotted relation in Figure 2, we see small amounts of WIA leads to a faster decrease in teachers' work-life balance than one would expect under a linear relationship. Likewise, additional WIA leads to a slower decrease in work-life balance than under a linear relationship.

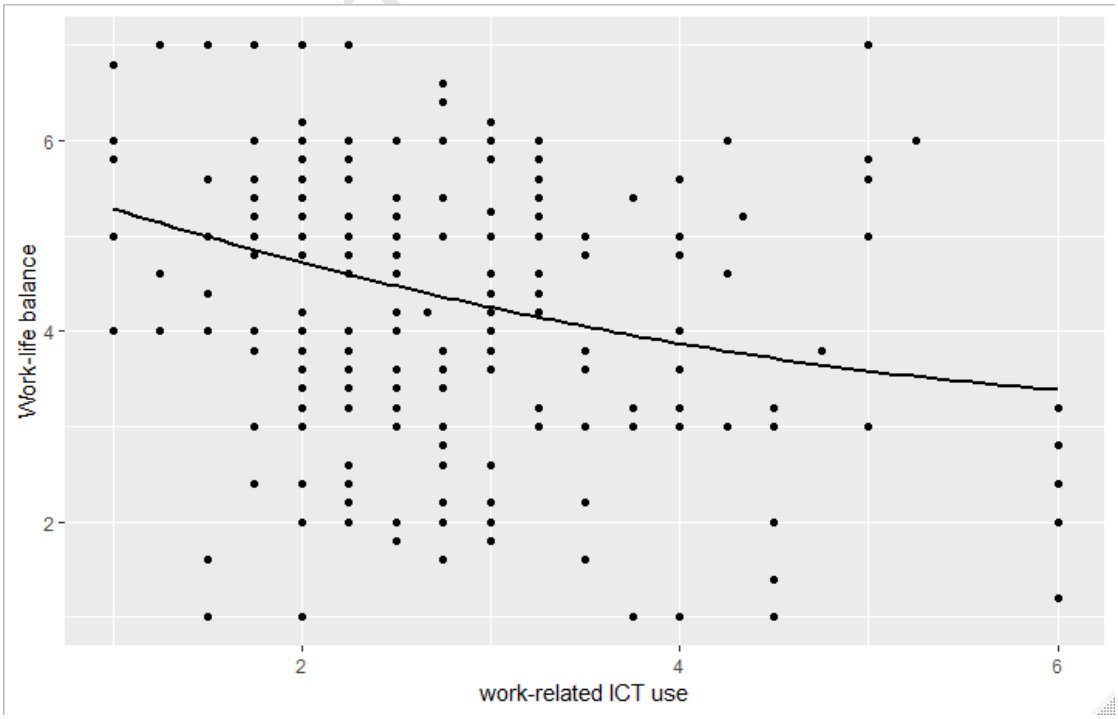

Figure 2. Nonlinear relation between work-related ICT use after hours (WIA) and work-life balance

5. DISCUSSION AND CONCLUSIONS

The current study advances our understanding of how and when WIA relates to work-life balance (cf. Fenner & Renn, 2010; Schlachter et al., 2018) by examining the determinants and consequences of secondary school teachers' use of DLE. We hypothesized that teachers' acceptance of DLE would increase use after hours, ultimately reducing their work-life balance. We also hypothesized that this negative impact would be lower for teachers with a higher integration preference. Our findings show that social influence reduces teachers' work-life balance mediated by increased DLE use after hours. We observed no significant influence for the other technology acceptance factors or the moderating role of integration preference. Hereby, this study offers three contributions to scholarship on WIA and the integration of the technology acceptance framework with boundary theory and work-life research.

5.1 Theoretical implications

A first contribution of this study relates to enhancing our understanding of the antecedents and consequences of WIA. Contrary to the expectations, we found no support that teachers engaged in more WIA because they believed in the ease and professional benefits of DLE, nor because they received the technical support to do so. We do find a direct effect of performance expectancy on teacher's work-life balance. A potential explanation is that teachers with a stronger belief in the professional benefits of DLE experience less stress, strain and daily hassles from using DLE in the work-domain, reducing the likelihood of such event spilling over to life domains. More importantly, our findings suggest that social influence from colleagues and other peers serves as a key driver for teachers to engage in WIA. This observation contrasts studies drawing on the traditional TAM model (Davies, 1989), which have demonstrated performance

expectancy to be the most reliable predictor of different forms of ICT use behavior (Korunka & Vartiainen, 2017; Pynoo et al., 2011). Instead, our findings align more closely with the UTAUT (Venkatesh et al., 2003), which devotes additional attention to the contextual factors of technology use, as well as studies that underscore the importance of social influences as determinants of use behavior (Adkins & Premeaux, 2014; Richardson & Benbunan-Fich, 2011). A possible explanation comes from social identity theory (Tajfel, 2010), which advances that people tend to conform to the norms and behaviors of reference groups with whom they identify themselves. Particularly in occupations with a strong professional identity, like teachers, employees tend to be very susceptible to the social influence of their professional peers and engage in normative and behavioral conformism (Kreijns et al., 2013). Therefore, it might be useful for future research to operationalize social influence less generally by distinguishing between different sources of influence (e.g., family, supervisors, colleagues, students).

A second contribution of this study concerns the role of individual factors, in particular integration preference. While integration preference was associated with a higher work-life balance, the relationship between social norms and WIA was not significantly stronger for participants with a higher integration preference. Furthermore, there is no support that teachers with a higher integration experience the implications of WIA on their work-life balance as less severe. This seems to suggest that WIA, and DLE use after hours in particular, has negative consequences for work-life balances regardless of personal preferences for integration. Moreover, indications for a non-linear relation highlight that even modest WIA might have a profound impact on teachers' work life balance. At first sight, such observations seem to run counter to boundary theory, which underscores individuals' preference and behavior to manage boundaries between life domains. However, our findings contribute to boundary theory and our

understanding of boundary behavior by implying that certain contextual influences, like social influence or workplace norms, might hamper or constrain preferences or choices for work-life boundary management (Foucreault, Ollier-Malaterre, & Ménard, 2018). To explain such contextual influences, the UTAUT might be useful, as it highlights the broader considerations that are taking into account when engaging in particular use behaviors that cross boundaries. While we could not demonstrate empirical support for all of the factors in this model, we invite future studies to pay particular attention to potential (threeway-)interactions between individual integration preference and contextual determinants of WIA, like boundary management fit (cf. Bogaerts, De Cooman, & De Gieter, 2018) or integration norms (cf. Gadeyne et al., 2018). Preferably in other occupational groups with a strong professional identity, like engineers of physicians. In doing, future research can effectuate the integration of UTAUT and boundary theory.

A final contribution relates to the educational context. By focusing on teachers, we expand past research on WIA, which has mostly on white-collar professions (Fenner & Renn, 2010; Schlachter et al., 2018), with insights from a more 'grey-collar' occupational group with a strong professional identity. By showing that teachers intensify their use of DLE after hours in response to social influence from peers and with consequences for their work-life balance, our study demonstrates the potential risks associated with digitization in education. That is, by linking social influence to reduced work-life balance via WIA, we challenge the dominant assumption that 'technology acceptance' is unequivocally beneficial and highlight its potential 'dark side' (Adkins et al., 2014). Past research has been critical of the value for DLE and other educational technologies for teaching and learning (e.g. De Smet et al., 2012; Islam, 2014). However, implications for the well-being of the users should also be taken into account,

especially in light of the continuous development of these technologies and the possibilities they create for crossing boundaries between different life domains. This is particularly important, given that teachers already engaged in extensive work-related duties beyond formal hours and physical workspaces prior to the introduction of DLE.

5.2 Limitations

This study has limitations. First, DLE-use after hours presents a specific form of WIA in the education sector. In today's digital environment, teachers might engage in multiple types of WIA (e.g. contact with students or teachers via smartphone, preparing classes) that could exert differential impact on teachers' work-life balance. Therefore, future research could distinguish between *different types* of WIA. A second and related point is that this study did not take into account the *different purposes* for work-related ICT after hours. DLE allow teachers to perform a large diversity of tasks (e.g. grading, preparing courses, communication with parents and students). Some of these tasks might be more time-intensive or show a stronger interference with other life domains than other tasks. As a third limitation, our study relied on *cross-sectional* self-reported data, which is prone to common source bias and constrains causality claims. Future research could address these concerns through the use of diary studies and experience sampling (Derks et al., 2016). In ideal circumstances, technology acceptance and work-life balance measures could be coupled with factual user data on after work hours activity, to reflect actual use across life domains. Finally, our model did not take into account *behavioral intention*, but directly linked use behavior to performance expectancy, effort expectancy, social influence and facilitating conditions. While this could explain some of the non-significant relations in the model, our approach is consistent with past studies that have shown such direct links in the

UTAUT-model (e.g., Adkins & Premeaux, 2014; Bentley et al., 2016; Edmunds et al., 2012; Pynoo et al., 2011).

5.3 Managerial implications

On a practical level, our study informs schools and teachers in the context of challenges associated with the increasing use of ICT and, in particular, the popularity of DLE. As the professional use of these technologies extends to other life domains, concerns are raised over the of teachers' work-life balances. The results of our analyses lend credence to these concerns. School leaders should be aware that teachers also engage with DLE outside of their regular work hours and that this poses a burden to healthy work-life balance. Moreover, our study suggests that this engagement does not seem a matter of personal preference, but is rather a response to social influence from peers. This implies that schools and teacher could mitigate the negative implications of DLE on teachers' work-life balance by intervening in this normative environment. For example, schools could cement the use of DLE in the private sphere by establishing clear rules for usage or could even restrict the access to such technologies outside of the formal work hours.

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HIGHLIGHTS

- Teachers use digital learning environments after hours in response to social influence from peers.
- The use of digital learning environment after hours has an adverse impact on the work-life balance of teachers.
- This adverse impact occurs independent of teacher's individual preference for integration work and life domains.
- Results endorse school policies that cement the use of digital learning environments in the private domain.